EX PARTE OR LATE FILED

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June 22, 1998

Ms. Magalie Salas
Office of the Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: WT Docket No. 96-86: Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communication Requirements Through the Year 2010;
Notice of Written *Ex Parte* Statement

Dear Ms. Salas:

On behalf of the Dataradio Group of Companies (DATARADIO), and pursuant to Section 1.1206(b)(1) of the rules and regulations of the Federal Communications Commission, I am submitting the original and four copies of the enclosed written *Ex Parte* Statement for filing in the above-referenced rule making proceeding. Please ensure that this Statement is associated with the Docket files established for WT Docket No. 96-86.

If you should have any questions, kindly contact the undersigned counsel for DATARADIO.

Very truly yours,

Frederick J. Day

Frederick J. Day
Counsel for the
Dataradio Group of Companies

Enclosure

No. of Copies rec'd 0+4
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FCC Docket Filing Coversheet

Docket Number:	WT 96-86
Type of Document:	*Ex Parte* Statement
Petitioner/Party:	DATARADIO
Preparer:	Frederick J. Day
Law Firm:	Day, Catalano & Plache
Date Filed:	06/22/98

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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JUN 22 1998

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of	)	
	)	
The Development of Operational,	)	**WT Docket No. 96-86**
Technical and Spectrum Requirements	)	
for Meeting Federal, State and Local	)	
Public Safety Agency Communication	)	
Requirements Through the Year 2010	)	

EX PARTE STATEMENT OF
THE DATARADIO GROUP OF COMPANIES

Filed by:

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June 22, 1998

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SUMMARY

In this *Ex Parte Statement,* DATARADIO urges the Federal Communications Commission to design its rules for 746-806 MHz with a view toward facilitating the development of wireless networks that will support the data applications of Public Safety entities. Data communications are playing an ever-increasing role in the changing landscape of wireless communications, especially with respect to Public Safety applications. In response to this changing landscape, DATARADIO believes that the Commission must permit the Public Safety sector to use the spectrum at 746-806 MHz for data technologies -- on an equal footing with traditional analog voice communications. In order for data technologies to assume an equal footing with voice communications, the Commission must adopt rules that properly recognize the role of data technologies as a more efficient and forward-looking means of serving Public Safety licensees.

Over the past two decades, as public safety requirements for data communications have expanded, there has been a conspicuous lack of new spectrum for data communications. Data applications are more efficient than voice and represent a high potential for spectrum efficiency. Modern police methods call for the same access to information for a mobile user as one who is located in an office. To accommodate the current and developing need for mobile transmission

of graphical information, the Commission must design its rules for the Public Safety allocation to assign spectrum in varying bandwidths ranging from 12.5 kilohertz up to 150 kilohertz.

DATARADIO believes that it would be shortsighted and counterproductive for the Commission to attempt to dictate the most appropriate technology for public safety data networks at 746-806 MHz. The standards developed should incorporate only those factors necessary to ensure an effective signal and the protection of other users. In this regard, DATARADIO also urges the Commission to refrain from attempting to mandate interoperability standards for public safety data transmissions. Any such effort to achieve interoperability would involve a considerable degree of complexity and would impede efforts to bring data systems to the market in a timely manner.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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To: The Commission

EX PARTE STATEMENT OF THE DATARADIO GROUP OF COMPANIES

The Dataradio Group of Companies (DATARADIO), by its attorneys and pursuant to Part 1 of the rules and regulations of the Federal Communications Commission, hereby submits this *Ex Parte Statement* in the above-captioned proceeding.

PRELIMINARY STATEMENT

The Dataradio Group of Companies consists of Dataradio, Inc., Dataradio Corporation and Johnson Data Telemetry Corporation. The Dataradio companies are engaged in the development, manufacture and implementation of wireless products and networks that support data applications for both mobile and fixed uses by Public Safety entities and other private wireless users.

DATARADIO is the leading provider of mobile computing network infrastructure for private users in the United States. DATARADIO works closely with over 100 application software and middleware partners and all major mobile radio manufacturers to supply a full range of services and products for its customers. The projects accomplished by DATARADIO and its partners range from hundreds of small systems having as few as several cars to many multi-site systems encompassing up to several thousand vehicles each and covering thousands of square miles in a single system.

DATARADIO sold its first Public Safety mobile data system in 1986. To date, it has sold some 500 Public Safety mobile data networks, with Public Safety systems accounting for 60 percent of DATARADIO's sales of private mobile data networks.[1] DATARADIO holds the distinction of having invented mobile radio computing. Included among the milestones in DATARADIO's history is the first installation, by any equipment manufacturer, of a personal computer in a police patrol vehicle.[2]

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[1] In addition to sales to Public Safety users, DATARADIO also manufactures and sells mobile data systems for other private wireless customers, including such critical mission users, among others, as Utility Companies and entities engaged in Land Transportation and Energy Production and Transmission.

[2] DATARADIO's first installation of a personal computer in a police vehicle was in a town named Otterburn Park, a suburb of Montreal, in 1988. The system used modems adapted from a military project. DATARADIO's first installation of personal computers in patrol cars in

OVERVIEW

DATARADIO appreciates this opportunity to submit its views and comments on the ongoing developments and future direction of the Public Safety planning and allocation proceeding. DATARADIO believes that the Commission must be more cognizant of the actual role data is playing in the changing landscape of land mobile communications. Equally important, the Commission's allocation decisions must respond to this changing landscape in two critical respects. *First*, the Commission must permit the Public Safety sector to use the spectrum at 746-806 MHz for data technologies -- on an equal footing with traditional analog voice communications. *Second*, the Commission must adopt rules that properly recognize the role of data technologies as a more efficient and forward-looking means of serving the public through the Public Safety Radio Service.

As one of the nation's most prominent manufacturers of data equipment for land mobile communications, DATARADIO has had ample opportunity to assess the impact of data technologies in the Public Safety environment. The increased utilization of data technologies is exerting a significant impact on the

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the United States occurred in late 1989 in Freemont, California. As a result of the attention surrounding the Freemont, CA installation, DATARADIO soon sold a dozen more mobile computing systems in California, including sale of a network to the Beverly Hills, CA police and fire departments.

communications employed by Public Safety entities. Mobile data networks will play an indispensable role in Public Safety operations in the United States and throughout the world for years to come.[3] DATARADIO believes the Commission must be more sensitive to the immediate need to create an environment in the United States that is conducive to the development of mobile data networks. Further, DATARADIO is well poised to assist the Commission in creating the proper regulatory structure for the continued development of wireless data networks designed to serve the Public Safety community.

The Public Interest Demands Prompt Allocation and Use of the Spectrum at 746-806 MHz for Public Safety Purposes.

DATARADIO's guiding principle is that the spectrum in the 746-806 MHz range should be made available for use by Public Safety entities in the shortest time possible. Toward that end, DATARADIO favors agency actions that are limited to

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[3] The Public Safety community was an early adopter of mobile data, having employed mobile data technology since 1981. The initial mobile data systems were "dumb terminals" that typically consisted of sixteen lines of 32 characters. The terminals were ASCII test-only devices with no processing power on board. Today, due in large part to innovations by DATARADIO, Public Safety vehicles are outfitted with Pentium PC's having hugely greater bandwidth and processing power than the early "dumb terminals." Ironically, however, to the detriment of Public Safety users, the bandwidth of wireless communications channels has not followed suit. Rather, there has been significant momentum in the direction of reducing channel bandwidths for private wireless systems. In the context of mobile data, the continued emphasis on reduction of channel bandwidths, which is intended to make more efficient use of the available radio spectrum, has had the opposite effect. Rules aimed at implementing relatively narrow channel bandwidths have denied Public Safety users access to modern technologies essential for officer safety and effective crime prevention.

those rules and regulations that are absolutely necessary to implement use of the new spectrum. In DATARADIO's view, the primary focus of the FCC's rules should be to craft a regulatory environment that ensures users will have the benefit of an effective radio signal. The FCC's rules should be written in a way that fosters the maximum throughput rather than the greatest speed of transmission. Moreover, underlying the FCC's rules, there should be a sensitivity to making available data networks that minimize cost and maximize coverage and user control.

The Public Safety Allocation at 746-806 MHz Should Be Designed to Place Data Communications on an Equal Footing with Voice Communications.

Over the past two decades, Public Safety requirements for data communications have expanded exponentially. At the same time, there has been a conspicuous lack of new spectrum for data communications. DATARADIO urges the Commission to make the spectrum at 746-806 MHz available for data systems as well as for voice. The demand for data transmissions is well-established. DATARADIO notes that data applications are more efficient than voice and represent a high potential for spectrum efficiency. Accordingly, DATARADIO urges the Commission to give greater emphasis to supporting data operations in the instant proceeding -- in stark contrast to the distinctly secondary status accorded data applications in previous allocations. Specifically, DATARADIO recommends that the Commission, when allocating spectrum and developing the rules for 746-

806 MHz, recognize the rapid demand growth rate for data technology, as opposed to voice. At any given time, Public Safety users may be browsing a database using a personal computer-based reader or pulling down graphic files in compressed format. Flexibility is required to best serve the public, since the evolution of computer hardware and services is difficult to predict more than a few months into the future.

Modern Police Methods Require that Public Safety Officials Have Continuous Access to Law Enforcement Databases.

Modern police methods call for the same access to information for a mobile user as one who is located in an office. Officers in mobile units or on foot must have the ability to swiftly access databases that include graphical information, most notably photographs. Apart from surveillance activities, the current and anticipated future Public Safety requirements include the ability to send images ("mug shots") which are readily available from digital still cameras or databases. There are no currently available databases of motion pictures, nor are such databases anticipated for the foreseeable future.

DATARADIO does not favor using valuable mobile spectrum for surveillance operations. Rather, it seems clear that existing short-range microwave technology, as is commonly available for the 21.2-23.6 GHz microwave bands and higher bands, can adequately handle surveillance work. If mobile spectrum were to

be used for surveillance activities, either the channel bandwidth would be prohibitively large, creating congestion, or the equipment would be extremely costly and suffer from restricted range.

Data Technologies Are the Key to Greater Spectrum Efficiency.

The increased use of data technologies will ultimately promote greater spectrum efficiency as much of the current voice operations will be supplanted by information provided in the form of digital communications. Illustrative of the emerging data uses are: the transfer of textual information between system operators and mobile workers, including but not limited to more accurate and faster dispatching; faster and more widespread access to automated data bases[4]; transfer of image and other graphic information to effect more timely job performance; and improved and more timely vehicle location information as a means of enhancing safety and efficiency. Over the past ten years, hundreds of companies have been created out of the need for providing application and related software in response to the trend toward enhanced use of data technologies. This is truly a marketplace in

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[4] With respect to the use of mobile data communications to provide radio-based local area networks, DATARADIO observes that, in almost every work environment, the channel bandwidth required for LAN connections greatly exceeds the bandwidth needed for standard analog voice communications. Accordingly, the increasing emergence of "mobile work stations" in the office environment will demand, for the future, increasingly larger allocations of spectrum for data communications and, in turn, assignment of that spectrum in larger authorized bandwidths.

action -- not one mandated by any sort of regulatory initiatives. The appearance of data application and software solutions has created a new paradigm for communications between mobile workers and their related base operations. Land mobile "technology" now increasingly includes the techniques of CAD (computer-aided dispatch), mobile computing, AVL (automatic vehicle location), and other methods for better deployment and management of people and other resources. The requirement for data systems will only increase in the future as Public Safety organizations come to rely increasingly on timely access to data as well as more sophisticated control measures and more adequate communications capacity.

DATARADIO has noted with interest the position taken by the National Public Safety Telecommunications Association with respect to the integration of voice and data allocations in a single band plan. The current state of technology does permit successful integration of voice and data transmissions, both in the same allocation and in the same bandwidth. DATARADIO believes that the future requirements of the Public Safety community can only be satisfied by ensuring that there is adequate spectrum available for data communications. In DATARADIO's view, the Commission no longer can satisfy its public interest obligations by allocating spectrum for purely voice applications. The Commission must create an environment in which data communications can develop without restriction. The

only way to create such an environment is to ensure that data is placed on an equal regulatory footing with voice. With regard to the proposed Public Safety allocation in the 746-806 MHz band, DATARADIO believes that the marketplace should make the decision as to how much spectrum should be used for data and how much for voice. The Commission's only obligation in this respect is to ensure that the rules do not favor voice over data, but rather create an environment in which users' needs will dictate the use of voice or data, as appropriate.

The Commission Must Create Varying Bandwidths of Up to 150 Kilohertz in the Public Safety Allocation.

To accommodate the current and developing need for mobile transmission of such graphical information, the Commission must design its rules for the Public Safety allocation to assign spectrum in varying bandwidths ranging from 12.5 kilohertz up to 150 kilohertz.

DATARADIO believes that a minimum efficiency standard of 0.768 bits per hertz is acceptable, especially for channels wider than 25 kilohertz. This transmission rate represents a realistic compromise between bit rate and effective range.[5] While higher bit rates are possible, such rates would impose penalties upon

[5] For channels of less than 12.5 kilohertz, DATARADIO would not impose a minimum efficiency standard on data transmissions. Subjecting such narrow channels to an aggressive minimum bit rate imposes harsh requirements on the stability of radios using FM modulation. To illustrate, sending 4800 bits per second in 6.25 kHz bandwidths is much more difficult than transmitting 9600 bits per second in 12.5 kHz bandwidths unless the radio is made at least twice

users in terms of range and cost. Such penalties may be acceptable to jurisdictions with large budgets but would run the risk of placing the new spectrum out of reach for many Public Safety agencies outside the top 20 metropolitan areas.

Most database images used in the Public Safety sector at present are black and white. Full screen photographs with standard JPEG compression can be sent using 100,000 bits for black and white and approximately 400,000 bits for color. DATARADIO, as well as others in the industry, judge a channel that is capable of delivering a black and white image via an RF channel in approximately one second to be adequate. Allowing the necessary capacity for overhead and retransmission errors, DATARADIO has determined that channel bandwidths of varying sizes, ranging from 12.5 kilohertz to 150 kilohertz would be sufficient to satisfy the present and foreseen requirements of Public Safety users.

Within varying bandwidths of up to 150 kilohertz, manufacturers could readily present a variety of solutions to serve users' requirements. Smaller jurisdictions, in particular, would be well-served by equipment operating in the 128 kilobits per second range. Such equipment would offer three major benefits to users: *first*, from the standpoint of cost, the equipment could be made available on the market for a cost that would exceed the cost of present radio/modem equipment

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as stable.

by only 15 percent or less; *second*, the equipment would not impose any range penalty, as compared to equipment designed for 12.5 kHz analog voice channels using the same effective radiated power; and, *third*, the equipment would provide performance levels that are 10 times better than the present systems.

Jurisdictions that require higher bit rates and which are prepared to pay for higher cost equipment and an enhanced infrastructure, i.e., more intensive use of base stations, could opt for equipment with much higher bit rates. However, imposing such a high-cost solution on smaller departments may inflict a disservice on those departments, especially if their operating budgets are already strained.

The Commission Should Not Mandate Technology But Rather Should Allow the Marketplace to Select The Most Appropriate Technologies.

DATARADIO firmly believes that it would be shortsighted and counterproductive for the Commission to attempt to dictate the most appropriate technology for Public Safety data networks at 746-806 MHz. The standards developed should incorporate only those factors necessary to ensure an effective signal and the protection of other users.[6] The experience in the cellular/PCS telephony market is instructive. Cellular/PCS providers are using a variety of incompatible technologies at present. Large carriers, each backed by considerable

[6] Insofar as the protection of other users is concerned, DATARADIO is supportive of the out-of-band emission specifications that Motorola, Inc. has recommended in its comments.

scientific expertise and in-house staffs, have selected from a range of incompatible technologies including FDM, frequency hopping spread spectrum, CDMA, narrowband TDMA and broadband (GSM) TDM. Ultimately, the marketplace will sift through all of these competing alternatives and determine the most suitable technologies. In view of the complex considerations underlying selection of technology, DATARADIO believes that the decision must be left to the marketplace.

For the emerging mobile data market, similar considerations apply. Though TDMA is currently being proposed by some vendors, Public Safety agencies have expressed concern about the short-term and long-term effects of high power (20-40 watts) TDM units in their patrol vehicles. This issue, in particular, has not been put to rest. In DATARADIO's view, the uncertainty surrounding TDMA in a public safety setting reinforces the need for a marketplace solution to the dilemma of the appropriate technology. Certainly, at this juncture, it would be unwise for the Commission to identify or favor any particular technology, especially since such a decision would circumvent the natural competitive forces of the marketplace.

Commercial (For-Profit) Networks Have Not Demonstrated the Ability to Accommodate the Needs of Public Safety Users.

Communication support for the new data application and software solutions is best carried out in systems that are uniquely designed using a private network. The bulk of the Public Safety user community have chosen not to use CMRS networks for their communications requirements. There are two principal reasons responsible for this development: *first*, CMRS networks are often not designed to provide the security required for Public Safety applications and, *second*, CMRS networks are often incapable of properly supporting the needs of Public Safety users in times of crisis.

Public Safety data applications are very user specific. For this reason, the "one size fits all" philosophy of CMRS networks has not been effective, in many cases, due to such factors as the lack of coverage area, network availability (timely access) during emergency situations and throughput (response time). Further, Public Safety entities cannot be dependent upon CMRS providers to make, on a timely basis and coincident with users' requirements, service architecture changes that are most appropriately handled in high bandwidth channels. For these reasons, DATARADIO believes it is neither appropriate nor in the public interest to require Public Safety users to rely on public networks for wideband data imaging and

graphical information transfers requiring high bandwidth channels.

Any Effort to Impose Hardware and Software Compatibility Standards, In the Name of Interoperability, Will Increase the Cost of Systems and Delay the Implementation of New Technology.

Over the past few years, DATARADIO has observed some of the adverse effects caused by well-intentioned efforts to promote interoperability standards. While the premise underlying the desire for interoperability standards remains valid, it has proven difficult to elicit the full cooperation of equipment manufacturers in achieving interoperability.

It should be noted, for example, that the APCO 25 effort to establish interoperability between voice users, despite an extraordinary amount of dialogue among manufacturers and users, has met with only mixed results. The issue of interoperability becomes even more complex when the landscape is data. The main focus of APCO 25 was to secure agreement on a Common Air Interface and CODEC. The hope was that voice transmissions could be properly decoded by any compatible radio. By comparison, data networks would require far greater standardization to ensure interoperability.

In the current environment, there are hundreds of application software vendors serving the market. To establish a standard for data-only channels, there would have to be an APCO 25-style common air interface as well as standards to

govern application software. Even assuming that one had compatible radio modems, there is a very low probability that software designed to communicate with an existing data base server could communicate with a different application software package serving departments in different jurisdictions. Public Safety databases vary from state to state. There is little standardization. DATARADIO's experience suggests that there are at least ten differing database standards in common use today. With this degree of variation, imposing hardware and software compatibility standards might require that any department wishing to buy such a system would have to spend additional funds to replace existing LANs, WANs and database applications. This would significantly delay the implementation of needed technology. It is DATARADIO's view that, in the past, there have been too many constraints placed on applicants, based on rules that either were not sufficiently flexible or were not designed to accommodate near and short-term changes in technology and user requirements. As a result, rules that were written in a system-specific or technology-specific manner thwarted the inevitable developments in technology and innovation within the industry.

CONCLUSION

DATARADIO strongly urges the Commission to allocate the Public Safety spectrum at 746-806 MHz in a manner that places data communications on a par

with voice. DATARADIO firmly believes that the rules developed for this allocation should recognize the vastly superior efficiencies of data over voice communications. Additionally, when crafting the rules for this allocation, the Commission should recognize that, with respect to data transmissions, smaller bandwidths are not necessarily more efficient than larger bandwidths. To accommodate state-of-the-art techniques such as computer-aided dispatch, mobile computing, automatic vehicle location, and transmission of image and other graphic information, the Commission must permit the Public Safety community to use channels of varying widths ranging from 12.5 kilohertz to 150 kilohertz. Variations in the available bandwidths will allow manufacturers and users to optimize the benefits of data transmissions and make full use of data technologies.

Further, it is imperative that the Commission act promptly to make the spectrum available as quickly as possible. The user community has a critical need for the additional spectrum and, especially, for the multitude of new data technologies that the spectrum will accommodate. In this regard, DATARADIO also urges the Commission to refrain from attempting to mandate interoperability standards for Public Safety data transmissions. Any such effort to achieve interoperability would involve a considerable degree of complexity and would impede efforts to bring data systems to the market in a timely manner.

WHEREFORE, The premises considered, DATARADIO urges the Federal Communications Commission to conform its rules in the above-referenced manner to the recommendations and comments set forth in this *Ex Parte* Statement.

Respectfully submitted,

The Dataradio Group of Companies
BY ITS ATTORNEYS

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